

Sub B1
2. (Amended) The [separator] bipolar plate of claim 1, wherein the electrically conducting pathway through the gas barrier is formed from a second porous, electrically conducting member selected from the group consisting of expanded metal mesh, metal foam, conducting polymer foam, porous conductive carbon material and combinations thereof.

3. (Amended) The [separator] bipolar plate of claim 1, wherein the gas barrier is a metal.

4. (Amended) The [separator] bipolar plate of claim 1, wherein the gas barrier comprises a polymer.

Sub B2
a1
5. (Amended) The [separator] bipolar plate of claim 1 further comprising a cooling fluid channel within the gas barrier.

6. (Amended) The [separator] bipolar plate of claim 1, wherein the gas barrier and the porous, electrically conducting member are essentially parallel.

7. (Amended) A [separator] bipolar plate for electrochemical cells, comprising:

a porous, electrically conducting sheet selected from the group consisting of expanded metal mesh, metal foam, conducting polymer foam, porous conductive carbon material and combinations thereof; and

a gas impermeable material disposed within a minor portion of the sheet to form a gas barrier.

8. (Amended) The [separator] bipolar plate of claim 7, wherein the gas impermeable material is selected from the group consisting of polymers and metals.

9. (Amended) The [separator] bipolar plate of claim 7, wherein the gas impermeable material is a polymer selected from the group consisting of water permeable polymers, thermoplastic polymers, reactively cured polymers, and combinations thereof.

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cont.

10. (Amended) The [separator] bipolar plate of claim 7, wherein the gas impermeable material is an epoxy.

11. (Amended) The [separator] bipolar plate of claim 7, wherein the gas impermeable material is a thermoplastic polymer selected from the group consisting of polyethersulfone (PES), nylon, and polycarbonate.

12. (Amended) The [separator] bipolar plate of claim 7, wherein the gas impermeable material is a perfluorinated sulfonic acid polymer.

13. (Amended) The [separator] bipolar plate of claim 7, wherein the gas impermeable material is selected from the group consisting of titanium, stainless steel, aluminum, magnesium and alloys thereof.

14. (Amended) The [separator] bipolar plate of claim 7, wherein the gas barrier is formed along one face of the porous sheet.

15. (Amended) The [separator] bipolar plate of claim 7, wherein the gas barrier is formed within a central portion of the porous sheet.

16. (Amended) The [separator] bipolar plate of claim 7, wherein the gas impermeable material is disposed within a face of the sheet, and further comprising a second porous, electrically conducting sheet selected from the group consisting of expanded metal mesh, metal foam, conducting polymer foam, porous conductive carbon material and combinations thereof, wherein the second porous sheet is in electrical contact with the [side] face of the porous sheet having the gas barrier.

17. (Amended) The [separator] bipolar plate of claim [6] 5, wherein the cooling fluid channel is water permeable.

18. (Amended) The [separator] bipolar plate of claim [16] 17, wherein the cooling fluid

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channel is disposed through or in contact with the gas impermeable material.

19. (Amended) The [separator] bipolar plate of claim 17, wherein the cooling fluid channels comprise a plurality of cooling fluid tubes.

Sub. B3
20. A [separator] bipolar plate for electrochemical cells, comprising:
two porous, electrically conducting sheets selected from the group consisting of expanded metal mesh, metal foam, conducting polymer foam, porous conductive carbon material and combinations thereof; and
an electrically conducting gas barrier disposed in electrical contact between the sheets, wherein the electrically conducting gas barrier is disposed between opposing faces of each sheet.

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21. (Amended) The [separator] bipolar plate of claim [18] 20, wherein the electrically conducting gas barrier is a metal sheet.

22. (Amended) The [separator] bipolar plate of claim [19] 21, wherein the metal sheet is titanium.

23. (Amended) The [separator] bipolar plate of claim [19] 20 further comprising a polymeric cell frame peripherally enclosing [a] the porous electrically conducting sheet.

24. (Amended) The [separator] bipolar plate of claim 23 wherein the polymeric cell frame includes channels in fluid communication with the porous electrically conducting sheet.

25. (Amended) The [separator] bipolar plate of claim 20, wherein the porous, electrically conducting sheets have interdigitated channels communicating to the edge of the sheets.

26. (Amended) The [separator] bipolar plate of claim 20 further comprising a cooling fluid channel within the electrically conducting gas barrier.